# CLAIMS

**1. (Currently Amended)** A method implemented in a content distribution server, the method comprising:

obtaining a bitstream of encoded video data, the encoded video data including an encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a high HQRB (high quality reference bit-rate) that determines how many bits of an enhancement layer bitstream are used to reconstruct a high quality reference image;

decoding [[an]] the enhancement layer bitstream from the bitstream of encoded video using the content distribution server ~~and an encoded base layer bitstream from a the bitstream of encoded video data, the encoded video data including the encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a high HQRB (high quality reference bit-rate) that determines how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference image~~;

extracting motion vectors from the encoded base layer and skipping coded coefficients and other information at the encoded base layer to transcode the enhancement layer bitstream;

determining data throughput characteristics of a content distribution network coupled to a client computing device using the content distribution server;

calculating a new HQRB based <u>at least </u>on a difference between the data throughput characteristics of the network and a bit rate of the encoded base layer in the bitstream of encoded video data using the content distribution server;

encoding the decoded enhancement layer bitstream based <u>at least </u>on the new HQRB to generate a transcoded enhancement layer bitstream using the content distribution server; and

streaming the transcoded enhancement layer bitstream to the client computing device using the content distribution server with the encoded base layer bitstream with encoding that is at least partially optimized for the throughput characteristics of the content distribution network.

**2. (Previously Presented)** The method of claim 1, wherein the encoding substantially optimizes transcoded enhancement layer for streaming with the base layer across the network to the client computing device as compared to streaming of the encoded video data.

**3. (Previously Presented)** The method of claim 1, wherein the encoded video data is encoded using progressive fine-granularity scalable (PFGS), MA-FGS, or RFGS encoding criteria.

**4. (Currently Amended)** The method of claim 1, further comprising determining when the data throughput characteristics indicate a relatively low data throughput, and wherein calculating the new HRQB comprises:

encoding the decoded enhancement layer bitstream with the new HRQB having a bit rate lower than the high HRQB in response to the determining of a relatively low data throughput[[,]].

**5. (Previously Presented)** The method of claim 1, further comprising determining when the data throughput characteristics indicate a relatively high data throughput, and wherein calculating the new HRQB comprises:

encoding the decoded enhancement layer bitstream with the new HRQB having a bit rate the same or higher than the high HRQB in response to the determining of a relatively high data throughput.

**6. (Currently Amended)** The method of claim 1, wherein the encoding further comprises:

determining the motion vectors extracted vector(s) from the encoded base layer without decoding the bitstream of the encoded base layer without decoding an entirety of a bitstream corresponding to the base layer; and

encoding the enhancement layer bitstream with the determined motion vector(s) to generate the transcoded enhancement layer for streaming to the client computing device.

**7. (Currently Amended)** The method of claim 1, wherein the method further comprises streaming the transcoded enhancement layer and the encoded base layer across the network to the client computing device.

**8. (Currently Amended)** The method of claim 1, wherein the method further comprises encoding video data to generate the one or more enhancement layers and the <u>encoded</u> base layer.

**9. (Currently Amended)** The method of claim 1, wherein the method further comprises determining networking and/or video presentation capabilities of the client computing device, and wherein calculating the new HQRB further comprises formulating the new HQRB based <u>at least</u> on one or more of the networking and/or video presentation capabilities.

**10. (Currently Amended)** A computer-readable memory storage device encoded with computer-executable instructions that, when executed by a processor in a content distribution server, implement operations comprising:

<u>(a) producing a bitstream of encoded video data, the encoded video data including an encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a high level high quality reference bit-rate (HQRB) that determines how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference;</u>

([[a]]<u>b</u>) decoding [[an]] <u>the</u> enhancement layer bitstream ~~using the processor and an encoded base layer bitstream~~ from [[a]] <u>the</u> bitstream of encoded video data, <u>using the processor</u> ~~the encoded video data including the encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a~~

~~high HQRB (high quality reference bit-rate) that determines how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference image;~~

([[b]]c)extracting motion vectors from <u>encoded</u> the base layer <u>while keeping the bitstream of the encoded base layer unchanged</u> and skipping coded coefficients and other information at the <u>encoded</u> base layer to transcode the enhancement layer bitstream;

([[c]]d) determining data throughput characteristics of a content distribution network coupled to a client computing device and changes to the data throughput characteristics of the content distribution network using the processor;

([[d]]e) calculating a new HQRB based <u>at least</u> on the data throughput characteristics of the content distribution network and a bit rate of the encoded base layer in the bitstream of encoded video data using the processor, wherein the new, calculated HQRB is about equal to or less than the bandwidth used to deliver the unmodified, encoded, base layer; and

([[e]]f) encoding the decoded enhancement layer bitstream based <u>at least</u> on the new HQRB to generate a transcoded enhancement layer bitstream using the processor;

([[f]]g) streaming the transcoded enhancement layer bitstream to the client computing device using the content distribution server with the encoded base layer bitstream; and

([[g]]h) repeating (c) – (g) in response to changes in the data throughput characteristics of the network.

**11. (Currently Amended)** The computer-readable memory storage medium of claim 10, wherein the computer-executable instructions for encoding substantially optimize transcoded enhancement layer for streaming with the <u>encoded</u> base layer across the network to the client computing device.

**12. (Previously Presented)** The computer-readable memory storage medium of claim 10, wherein the encoded video data is encoded using progressive fine-granularity scalable (PFGS), MA-FGS, or RFGS encoding criteria.

**13. (Previously Presented)** The computer-readable memory storage medium of claim 10, wherein operations for calculating comprise operations, responsive to identifying a relatively low data throughput, for selecting the new HRQB to be lower than the high HRQB.

**14. (Previously Presented)** The computer-readable memory storage medium of claim 10, wherein operations for calculating the new HRQB comprise operations, for selecting the new HRQB to be the same or higher than the high HRQB in response to identifying a relatively high data throughput.

**15. (Canceled)**

**16. (Currently Amended)** The computer-readable memory storage medium of Claim 10, wherein the operations further comprise operations for streaming the transcoded enhancement layer and the <u>encoded </u>base layer across the network to the client computing device.

**17. (Currently Amended)** The computer-readable memory storage medium of claim 10, wherein the operations further comprise operations for encoding video data to generate the one or more enhancement layers and the <u>encoded </u>base layer.

**18. (Currently Amended)** The computer-readable memory storage medium of claim 10, wherein the operations further comprising operations for determining networking and/or video presentation capabilities of the client computing device, and wherein calculating the new HQRB further comprises formulating the new HQRB based <u>at least </u>on one or more of the networking and/or video presentation capabilities.

**19. (Currently Amended)** A computing device of a content distribution server comprising<u>:</u>

<u>a memory;</u>

a processor coupled to [[a]] <u>the</u> memory, the memory being encoded with computer-program instructions executable by the processor to implement operations ~~comprise~~ <u>comprising</u>:

decoding an enhancement layer bitstream from a bitstream of encoded video data using the processor, the encoded video data including ~~an encoded base layer and~~

one or more enhancement layers, the video data having been encoded according to a high HQRB (high quality reference bit-rate) that determines how many bits of the enhancement layer bitstream are used to reconstruct a high quality image;

extracting motion vectors from [[the]] an encoded base layer of the encoded video data and skipping coded coefficients and other information at the encoded base layer to transcode the enhancement layer bitstream;

determining data throughput characteristics of a content distribution network coupled to a client computing device using the processor;

calculating a new HQRB based at least on a difference between the data throughput characteristics of the content distribution network and a bit rate of the encoded base layer in the bitstream of encoded video data using the processor;

encoding the decoded enhancement layer bitstream based at least on the new HQRB to generate a transcoded enhancement layer bitstream using the processor;

streaming the transcoded enhancement layer bitstream to the client computing device; and

wherein the encoded base layer remains encoded for streaming to the client computing device and wherein the encoding is at least partially optimized for the data throughput characteristics of the content distribution network.


**20. (Currently Amended)** The computing device of claim 19, wherein the computer-executable instructions for encoding substantially optimizes transcoded enhancement layer for streaming with the encoded base layer across the network to the client computing device as compared to streaming of the encoded video data.

**21. (Previously Presented)** The computing device of claim 19, wherein the encoded video data is encoded using progressive fine-granularity scalable (PFGS), MA-FGS, or RFGS encoding criteria.

**22. (Previously Presented)** The computing device of claim 19, wherein the data throughput characteristics indicate a relatively low data throughput, and wherein the operations for calculating the new HRQB further comprise operations, responsive to identifying the relatively low data throughput, for selecting the new HRQB to be lower than the high HRQB.

**23. (Previously Presented)** The computing device of claim 19, wherein the operations for calculating the new HRQB further comprise operations, responsive to identifying a relatively high data throughput, for selecting the new HRQB to be the same or higher than the high HRQB

**24. (Canceled)**

**25. (Currently Amended)** The computing device of claim 19, wherein the operations further comprise operations for streaming the transcoded enhancement layer and the <u>encoded</u> base layer across the network to the client computing device.

**26. (Currently Amended)** The computing device of claim 19, wherein the operations further comprise operations for encoding video data to generate the one or more enhancement layers and the <u>encoded</u> base layer.

**27. (Currently Amended)** The computing device of claim 19, wherein the operations further comprise operations for determining networking and/or video presentation capabilities of the client computing device, and wherein calculating the new HQRB further comprises formulating the new HQRB based <u>at least</u> on one or more of the networking and/or video presentation capabilities.

**28. (Currently Amended)** A computer-readable memory storage device comprising processing means in a computer-readable storage medium, the processing means comprising:

<u>means for obtaining an encoded video data having an encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a high level high quality reference bit-rate (HQRB) that determines how many bits of the enhancement layer bitstream are used to reconstruct a high quality reference image;</u>

means for decoding [[an]] <u>the</u> enhancement layer bitstream ~~from encoded video data using an encoded base layer bitstream~~ from the encoded video data, <u>using the encoded base layer bitstream without decoding the encoded base layer bitstream</u> ~~the encoded video data having the encoded base layer and one or more encoded enhancement layers, the video data having been encoded according to a high HQRB~~

~~(high quality reference bit-rate) that determines how many bits of the enhancement~~ ~~layer bitstream are used to reconstruct a high quality reference image;~~

means for extracting motion vectors from the <u>encoded</u> base layer and skipping coded coefficients and other information at the base layer to transcode the enhancement layer bitstream;

means for determining data throughput characteristics of a content distribution network coupled to a client computing device;

means for calculating a new HQRB based <u>at least</u> on a difference between the data throughput characteristics of the content distribution network and a bit rate of the encoded base layer in the bitstream of encoded video data;

means for encoding the decoded enhancement layer bitstream based <u>at least</u> on the new HQRB to generate a transcoded enhancement layer bitstream;

<u>means for maintaining a difference between the enhancement layer encoded</u> <u>according to the high level HQRB and the enhancement layer bitstream based at least</u> <u>on the new HQRB;</u> and

means for streaming the transcoded enhancement layer bitstream to the client computing device with the encoded base layer bitstream wherein the encoding is at least partially optimized for the data throughput characteristics of the content distribution network.

**29. (Currently Amended)** The computer-readable memory storage device of claim 28, wherein the means for encoding substantially optimizes transcoded enhancement layer for streaming with the <u>encoded</u> base layer across the network to the client computing device as compared to streaming of the encoded video data.

**30. (Previously Presented)** The computer-readable memory storage device of claim 28, wherein the encoded video data is encoded using progressive fine-granularity scalable (PFGS), MA-FGS, or RFGS encoding criteria.

**31. (Previously Presented)** The computer-readable memory storage device of claim 28, wherein the means for calculating the new HRQB further comprise, responsive to identifying a relatively low data throughput, means for selecting the new HRQB to be lower than the high HRQB.

**32. (Previously Presented)** The computer-readable memory storage device of claim 28, wherein the means for calculating the new HRQB further comprise means for selecting the new HRQB to be the same or higher than the high HRQB in response to identifying a relatively high data network throughput.

**33. (Canceled)**

**34. (Currently Amended)** The computer-readable memory storage device of claim 28, wherein the processing means comprise means for encoding video data to generate the one or more enhancement layers and the encoded base layer.

**35. (Currently Amended)** The computer-readable memory storage device of claim 28, wherein the processing means further comprise means for streaming the transcoded enhancement layer and the encoded base layer across the network to the client computing device.

**36. (Currently Amended)** The computer-readable memory storage device of claim 28, wherein the processing means further comprise means for determining networking and/or video presentation capabilities of the client computing device, and wherein the means for calculating the new HQRB further comprises means for formulating the new HQRB based at least on one or more of the networking and/or video presentation capabilities.

**37. (New)** The computer-readable memory storage medium of claim 10, wherein the decoding of the enhancement layer bitstream, comprises processing by variable length decoding and bit-plane decoding to extract at least two groups of coefficients, the at least two groups of coefficients comprising:

a first of the at least two groups of coefficients being for the high quality reference; and

a second of the at least two groups of coefficients being for the high quality video decoded to be transcoded.

**38. (New)** The computing device as recited in claim 19, wherein the operations further comprise:

maintaining a difference between the enhancement layer encoded according to the high HQRB and the enhancement layer bitstream based at least on the new HQRB, the maintaining operation performed by components comprising:

an inverse discrete cosine transform (IDCT) module;

a frame buffer;

a motion compensation (MC) module;

a discrete cosine transform (DCT) module; and

a bit-plane coding module.

**39. (New)** The computing device as recited in claim 28, wherein the means for maintaining the difference between the enhancement layer encoded according to the high level HQRB and the enhancement layer bitstream based at least on the new HQRB comprise:

a means for performing inverse discrete cosine transform (IDCT);

a means for buffering frames;

a means for performing motion compensation (MC);

a means for performing discrete cosine transform (DCT); and

a means for performing bit-plane coding module.